

Docket No.: 03-02 US**REMARKS**

This is a response to the Office Action mailed June 2, 2006. Claims 1-22 have been pending in the present application. The Examiner rejected all pending claims. By this submission the Applicant amended claims 1, 11, 18, 20 and 22 to clearly define the invention of the subject application. Claims 9-10, 21 and 23 were canceled without prejudice. Abstract of the Disclosure was amended.

No new matter has been introduced. Reconsideration of rejections in view of the amended claims is respectfully requested.

Specification.

The Examiner objected the Abstract of the disclosure due to recitation the legal phraseology "said". The Applicant corrected the Abstract according to the Examiner's suggestion.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejected claims 1-3, 5-7, 9, 10, 16, 18, 20 and 21 under 35 U.S.C. § 102 (b) as being anticipated by Bley et al, US patent No. 6,277,177. The Applicant respectfully disagrees with this rejection for the following reasons.

Bley et al. teaches a heterogeneous gas-selective permeable membrane, having a sandwich structure formed by a supporting Si wafer and two layers of SiO₂ deposited on opposite faces thereof. The supporting Si wafer and one of the layers of SiO₂ have a plurality of through-holes, resulting in a corresponding plurality of "windows" of the second thin layer of SiO₂ only [*see for example: column 2, lines 38 – 41; Figures 3a – 3c and 4a – 4e*].

The present invention teaches a homogeneous gas-selective permeable membrane comprising a "body 11 of membrane 1 preferably consists of a sheet-like disc and it is made of a material selectively permeable to gases. For example, quartz, glass with high silica content and palladium are materials selectively permeable to gases." [*see the specification, page 3, lines 32-35*]. According to claim 1 the membrane comprises a body with at least one reduced thickness area, which is at least partially surrounded by a thicker area for ensuring the structural integrity

Docket No.: 03-02 US

of the membrane and heating means for selectively heating the reduced thickness area.

Bley et al membrane falls in the category of membranes discussed in the background section of the specification [*see the specification, page 2, lines 15-26*]. The heterogeneous gas-selective permeable membrane may suffer a, so called, separation phenomena, when the different layers forming the composite structure may separate due to the different coefficients of thermal expansion of the different materials employed. Thus, the membrane disclosed by Bley et al. does not include a body of a material permeable to at least one selected test gas, which comprises at least one reduced thickness area highly permeable to said test gas surrounded by a thicker area. On the contrary, in Bley et al. the body of gas-permeable material, i.e. the layer of SiO₂, has a uniform thickness on the whole surface of the membrane.

Moreover, due to the significantly different coefficients of thermal expansion of Si and SiO₂, the membrane disclosed by Bley et al. could not fulfill the objectives of the presently claimed invention, because it can not avoid the separation phenomena between the different layers of the membrane upon temperature variations.

The Examiner rejected claims 1-11, 16 and 17 under 35 U.S.C. § 102 (b) as being anticipated by German Patent DE 10122 733 of Gerdau et al. The Applicant respectfully disagrees with this rejection for the following reasons.

Though Gerdau et al disclose a gas-selective membrane formed as a homogeneous body, with varying thickness thereof, the design of membrane has a substantial difference with the membrane of the claimed invention. Gerdau et al teaches a heating device in the form of a meandering electric heating coil arranged in such a manner that the entire surface of the silicon oxide disk is practically uniformly heated. The heating means of the present invention specifically targets the reduced thickness areas. Claim 1 has been amended to emphasize that heating means selectively heats at lest one reduced thickness area. The support for this amendment can be found in the specification, which states that "Heating means 17 are provided on the opposite face 11b of membrane 1. An electric resistor adhering to the face 11b of membrane 1 and extending through all reduced thickness areas 15 forms heating means 17." [page 4, lines 8-10].

Docket No.: 03-02 US

The Examiner rejected claims 1-8 under 35 U.S.C. § 102 (b) as being anticipated by Japanese Published Patent application JP 8-73201 of Kobayashi. The Applicant respectfully disagrees with this rejection for the reason presented above in connection with analyzes of Bley et al patent.

More specifically, Kobayashi discloses a heterogeneous structure comprising a hydrogen permeable membrane sandwiched between supporting plates consisting of perforated metallic plates [*see abstract; Figure 1*]. In Kobayashi et al. the structural strength of the membrane is secured by the metallic supporting plates (2), while the hydrogen permeable membrane has the unique function of letting hydrogen pass there through. The maximum thickness of the membrane in Kobayashi et al. (30 μm) is substantially lower than the thickness of the thicker areas of the presently claimed membrane (1 – 2 mm) and in any case insufficient for providing the structural strength. In addition, due to the significantly different coefficients of thermal expansion of the metallic supporting plates and of the hydrogen selective membrane, the composite structure disclosed by Kobayashi et al. would be subjected to the separation phenomena between the different layers of the membrane upon temperature variations.

Claim Rejections - 35 U.S.C. § 103

The Examiner rejected claims 4, 8, 11 and 19 under 35 U.S.C. § 103 (a) as being unpatentable over Bley et al, US patent No. 6,277,177 in view of German Patent DE 101 22 733. The Applicant respectfully disagrees with this rejection since incorporation of “circular shape” of Gerdau et al into the reduced thickness areas of heterogeneous gas selective permeable membrane of Bley would not provide a homogeneous gas selective permeable membrane of the present invention as claimed in the amended claims.

Claims 12-15 under 35 U.S.C. § 103 (a) as being unpatentable by Bley et al, US patent No. 6,277,177 or German Patent DE 101 22 733 in view of Northrup et al (US 5,882,496) and Franz et al (US 6,541,676). Claims 12-15 are dependent on amended independent claim 1, therefore the arguments regarding the distinction between the claimed invention and cited references are applied to thereto. The Applicant respectfully submits that incorporation of, for example Northrup heater into Bley or Gerdau membrane structures would not provide a homogeneous gas selective permeable

Docket No.: 03-02 US

membrane with a heater, which heats selectively the reduced thickness areas as claimed in the present invention.

In light of the above amendments and remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

Respectfully submitted,



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Dated: August 24, 2006

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